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### Health-care coverage and access to health care in the context of type 2 diabetes and hypertension in rural Mexico

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## Review Paper

# Health-care coverage and access to health care in the context of type 2 diabetes and hypertension in rural Mexico: a systematic literature review

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## ABSTRACT

**Objective:** We aimed to identify the coverage rates and use of health care and to explore barriers and facilitators of access in rural Mexico.

**Study design:** Systematic review of the literature.

**Methods:** We undertook a structured search in the electronic databases EMBASE, Medline, and Scopus. Inclusion criteria comprised articles published in Spanish and English during the period 1986–2018. The studies were screened and selected by two independent reviewers in accordance with predefined criteria.

**Results:** The review included 14 studies. Over the last 30 years, the rates of health-care coverage have increased from 30% to >50% in rural Mexico. Although the rates of health-care coverage increased, aspects such as lack of resources, language, and health-care professionals remained important barriers to health care. Cash transfer programs were identified as a facilitator.

**Conclusions:** Despite increased health-care coverage of >50% in the last three decades, action is needed to fulfill the needs of rural Mexican populations. It is important to increase the number of trained health professionals who practice in rural areas. Moreover, health programs should be developed and adapted to meet the needs of rural and indigenous populations.

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## Introduction

Developing countries such as Mexico are undergoing an epidemiological transition, during which the burden of disease is high because of noncommunicable diseases (NCDs).<sup>1</sup> Today, type 2 diabetes mellitus (T2DM) is the leading cause of healthy life years lost and the second leading cause of death in Mexico, preceded only by heart diseases.<sup>2–4</sup> Moreover, it has been reported that the prevalence of high blood pressure is greater among obese adults and people with T2DM.<sup>5</sup> Currently, according to the International Diabetes Federation, the prevalence of T2DM in Mexico is 14.8%,<sup>6</sup> and the National Health and Nutrition Survey (ENSANUT, by its

initials in Spanish) indicates a prevalence of 9.2% in the rural population in 2016.<sup>7</sup> Furthermore, it is well known that hypertension is the most important risk factor for cardiovascular disease and its prevalence is 31% among Mexican adults<sup>8</sup> and 24.9% in the rural population.<sup>7</sup> The ENSANUT has shown that the proportion of people unaware of having T2DM or hypertension is 5% and 47.3%, respectively.<sup>8,9</sup>

NCDs are generally of long duration and slow progression. Worldwide, these are an important source of inequalities in mortality and life expectancy.<sup>10</sup> These inequalities can be present in screening, diagnosis, and treatment of NCDs. Furthermore, financial and physical access, health-care use and quality, individual and community characteristics are among the factors that may lead to them.<sup>10</sup> However, within the country, disparities can be found depending on the region.<sup>11</sup>

A leading cause to inequalities in detection, diagnosis, and treatment of NCDs is having a fragmented health-care system, a

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common feature in many countries in the Americas.<sup>12</sup> In Mexico, the health-care system is tripartite, divided into public, social insurance, and private health services. Social security and public health care are segmented; public health-care services comprise a complex net of diverse institutions disintegrated to social insurance. In contrast, the private health-care sector consists of private insurance providers, private practices, and hospitals.<sup>13,14</sup>

The main social security institution is the Instituto Mexicano del Seguro Social (IMSS; Mexican Institute of Social Security), offering services to 80% of the population entitled to social security. The second-largest provider is Instituto de Seguridad y Servicios Sociales de los Trabajadores del Estado (ISSSTE; Institute for Security and Social Services for State Workers)<sup>13,15</sup> On the other hand, the Ministry of Health (SSa by its initials in Spanish) provides health-care services to the population without social security; health-care service was provided on a public assistance basis. However, in 2003, a health-care reform established a new system of health protection: *Seguro Popular* (popular health insurance), which focused on covering around 50 million people without any public insurance scheme.<sup>15</sup> This scheme started in 2004, although it was not until 2005 that it came into action as a countrywide program, providing health care to workers in the informal sector, the unemployed, and their families.<sup>13,15</sup> In 2006, a considerable proportion of people with T2DM were most likely not receiving clinical supervision, as 41.8% were uninsured.<sup>16</sup>

The number of people insured increased largely with *Seguro Popular* affiliation, and nowadays this scheme is positioned as the second principal health-care provider, only behind IMSS.<sup>17,18</sup> The majority of the Mexican population is covered by some health-care scheme; 86% in 2016 according to the Mexican government report of 2017–2018.<sup>19</sup> However, this does not imply that the services offered are effectively used, as it is essential to consider the quality, access, and information regarding health-care services among different populations. Moreover, disparities regarding the availability of health services have been reported in some states of Mexico.<sup>17</sup>

The global urban–rural divide has disparities among settings, leading to uneven opportunities and social exclusion.<sup>20</sup> Today, only a minority of the population lives in rural areas. However, in Mexico, most indigenous populations, handicraftsman workers, one-third of adults aged 60 or older, and other vulnerable groups live in rural communities, which include almost 20% of the total population.<sup>9,20</sup>

Due to the increasing prevalence of T2DM and hypertension in Mexico, and the inequalities between the health-care accesses within the country, we sought to identify the coverage rates and use of health care and to explore barriers and facilitators of health-care access in the context of T2DM and hypertension in rural areas of Mexico.

## Methods

The protocol of the review was registered with the International Prospective Register of Systematic Reviews (PROSPERO 2018) and was assigned the following registration number: CRD42018085777.

### Inclusion criteria

All observational studies (cross-sectional, cohort, survey or case–control) reporting health-care use and coverage rates among adult populations ( $\geq 18$  years) living in rural areas of Mexico. In addition, only articles published in English or Spanish from 1986 to 2018 were considered; this period was chosen as the first national health and nutrition surveys were conducted during the period 1986–1988.

### Exclusion criteria

- Studies such as reviews, editorial letters, or other publications that did not provide new empirical data were excluded, as well as those articles not available as full-text.
- Articles that did not include information regarding rural populations or that only focused on rural Mexican migrants living in the United States of America or Canada were excluded.
- Studies in nonadult populations (<18 years) or without disaggregated data on adults were not considered.

### Information sources and search strategy

The search period occurred from February to April 2018. The following databases were consulted: Excerpta Medica Database (EMBASE), Medline and Scopus. The search strategy was built by combining key terms according to the population, exposure/outcome and the setting, the search strategy used in Medline is presented in Table 1.

### Study selection

Two researchers independently performed the study selection, which consisted of three main stages. First, all retrieved articles were screened by their study title. Second, abstracts from all selected articles in the first stage were read to determine their relevance. Finally, all articles considered potentially eligible were read in full to determine their relevance according to the inclusion criteria. Discrepancies were discussed, and consensus was sought with a third researcher. Data extracted from eligible studies included: author, journal, year of the study (or year of publication), study aim, study definitions, setting, study design, participants, and main results. The review process is presented in Fig. 1, which follows the Preferred Reporting Items for Systematic Reviews and Meta-Analysis (PRISMA) guidelines.<sup>21</sup> A total of 949 articles were retrieved. Subsequently, articles were screened, and as a result, a total of 14 articles were analyzed.

## Results

Overall, 14 studies were included in the review,<sup>16,22–34</sup> six papers were concerned with only the proportions of people with health-care coverage and the use of health-care services,<sup>16,23,26,29,30,32</sup> five described barriers and facilitators of health-care access,<sup>22,25,27,33,34</sup> and three papers reported both.<sup>24,28,31</sup> Henceforth, health-care coverage will be used to refer to health-care protection where an individual or a group of individuals are entitled to receive health-care services when needed

**Table 1**

Search strategy used in Medline.

1. Diabetes mellitus/or diabetes mellitus, type 2
2. Hypertension
3. Chronic disease/or noncommunicable diseases/or cardiovascular diseases
4. "Health Services Needs and Demand"/or primary health care/or health services/or "Delivery of Healthcare"/or health services accessibility
5. Health-care disparities
6. Attitude to health/or "Patient Acceptance of Healthcare"
7. Universal coverage/or insurance, health
8. Rural health services
9. Rural health
10. Community health services
11. MEXICO/or Mexico.mp.
12. 1 or 2 or 3
13. 4 or 5 or 6 or 7 or 8 or 9 or 10
14. 11 and 12 and 13

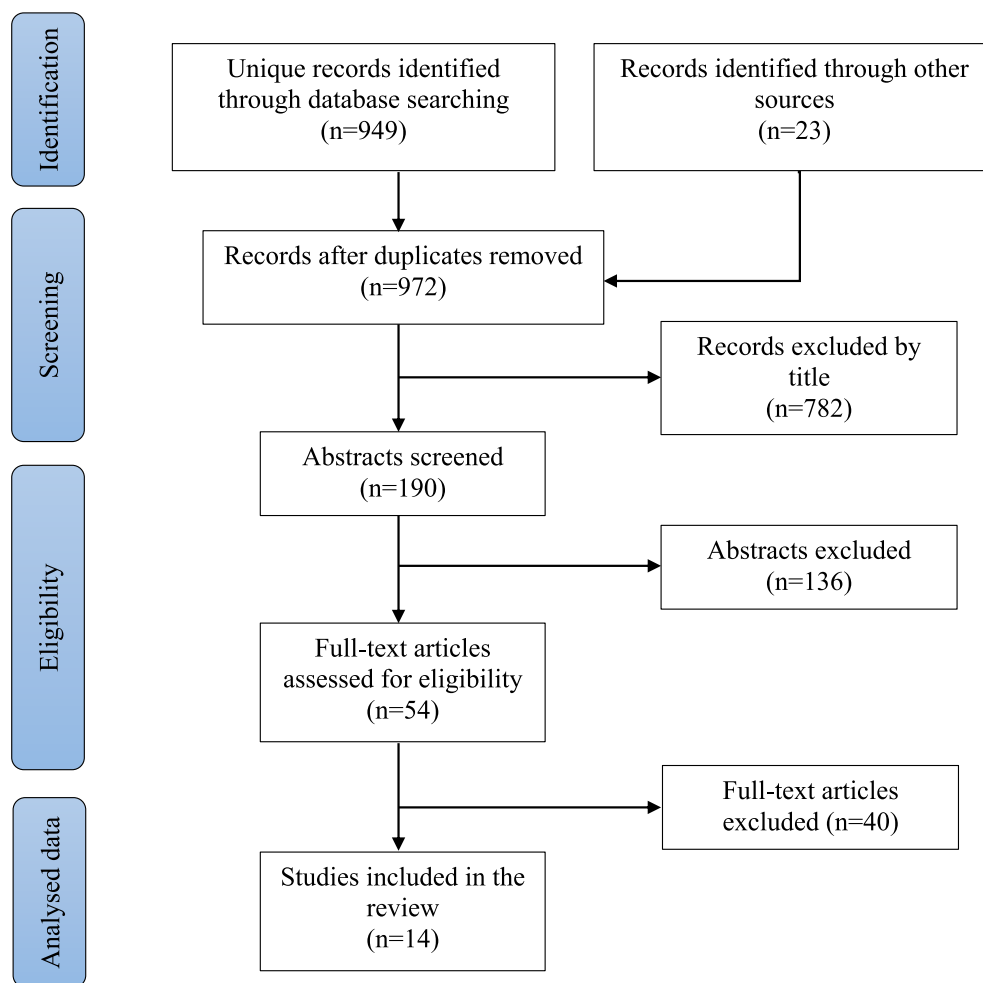


Fig. 1. Overview of the literature review process (database search).

without suffering financial hardship, which includes affiliation to the main social security institutions such as IMSS, ISSSTE, and/or *Seguro Popular*.

#### Health-care coverage and use of health-care services in people with type 2 diabetes and hypertension living in rural areas

The majority of the studies identified reported outcomes from analysis of national surveys (see Table 2). The first publication identified reporting coverage rates was by Borges-Yáñez and Gómez-Dantés in 1998, who described the results from the National Health Survey (ENSA, by its initials in Spanish). Overall, the majority of the population (82.7% men and 81.6% women) did not have access to health-care services.<sup>24</sup> Similar proportions were reported by Salinas (2000), who conducted an analysis of the Mexican Health and Aging Survey among adults  $\geq 50$  years.<sup>30</sup> It was reported that 75.9% of adults in rural areas were uninsured and health-care coverage remained low. Furthermore, it was reported that older people in rural localities were less likely to have been hospitalized.<sup>24</sup>

A study conducted in the North of Mexico by Salinas-Martínez and coworkers (1999) among adults with T2DM evaluated four dimensions of health needs: 1) perceived health necessities, 2) barriers of health care, 3) use of health care, and 4) availability. It was reported that overall, people in rural areas had a lower satisfaction level concerning health-care needs met, attendance to medical appointments was lower, and in general presented poorer

metabolic health, which included levels of glycemia, access to medical care, transportation time, and blood tests.<sup>35</sup>

In 2006, the ENSANUT was conducted across the country, and analyses sought to determine health-care coverage among people with T2DM and hypertension. Researchers found that 41.8% and 49.9% of people with T2DM and hypertension, respectively, had no health-care coverage.<sup>16</sup> In addition, among those who had coverage, the majority were through affiliation with *Seguro Popular*; having insurance was positively related to receiving antihypertensive treatment. However, most patients with T2DM reported not being referred for evaluations focused on preventing complications.<sup>23,29</sup>

Furthermore, cross-sectional analyses of the ENSANUT 2006 by Rivera-Hernández et al. (2011) revealed that the majority of the rural and indigenous populations were affiliated to *Seguro Popular*, 55.8% and 65.0%, respectively.<sup>29</sup> Jiménez-Corona et al. (2012) reported that actions for the prevention of diabetes complications, such as foot examination (10.9%), and ophthalmologic (6.7%), and renal function (3.9%) evaluations were carried out in participants with diabetes who lived in rural areas.<sup>26</sup> However, rates were lower than those for urban dwellers, which were 15.4%, 8.9%, and 5.1% respectively. Additionally, it was noted that the lack of glucose control was mainly due to low resources and quality of health-care services.<sup>29</sup>

Lastly, in 2013, Latham conducted a study in a central state of Mexico among adults with T2DM living in rural areas and reported that 60% were insured by *Seguro Popular* while only 8% were not insured.<sup>28</sup>

**Table 2**

Summary of publications included in the review that addressed coverage rates and use of health care.

Author(s)	Fieldwork years and region, state	Population	Study design	Coverage rates and use of health care in rural areas
Borges-Yáñez and Gómez-Dantés <sup>24</sup>	1994 Countrywide <sup>a</sup>	Adults $\geq 20$ years. Overall 9.9% of the participants had diabetes mellitus, 12.9% of women and 6.6% of men had hypertension.	Population-based study	For the analyses, the population was divided by sex, 82.7% of men did not have health-care coverage, and 81.6% of women were not covered. Overall, 66.2% of rural people using health-care services were not entitled to social security. Urban populations had a higher rate of health-care services use; OR 1.25 (1.02–1.52).
Salinas –Martínez et al. <sup>31</sup>	1999 North, Nuevo Leon	Adults with diabetes type 2 with two years of diagnosis or more and without hypertension, chronic kidney failure, or amputation.	Cross-sectional	Metabolic health was lower for rural dwellers (46.4% vs 60.4%, $P < 0.01$ ). This indicator included levels of glycemia, access to medical care, transportation time, and blood tests.
Salinas et al. <sup>30</sup>	2000 Countrywide <sup>b</sup>	Adults $\geq 50$ years in rural localities, 7.2% had diabetes, and 29.2% hypertension.	Cross-sectional	People from rural areas had a lower satisfaction level in relation to health-care needs met (36.8% vs 53.3%). People living in rural populations were less likely to be uninsured (75.9%) compared with urban populations (26.3%). Older Mexicans living in rural localities were significantly less likely to have been hospitalized in the previous year, due to the lack of health-care coverage.
Bleich et al. <sup>23</sup>	2005 Countrywide <sup>c</sup>	Adults $\geq 50$ years with hypertension. The rural population consisted of 2001 individuals.	Population-based study	More than half of the population (51.8%) were without health-care coverage. From the study population affiliated to <i>Seguro Popular</i> , 44.9% were rural population, and in less proportion from all social security, 12.7% belonged to rural communities.
Sosa-Rubí et al. <sup>32</sup>	2005–2006 Countrywide <sup>c</sup>	Adults between 20 and 80 years of age.	Cross-sectional	Rural populations were more likely to be affiliated to <i>Seguro Popular</i> . However, indigenous people were less likely compared with nonindigenous people. Overall, <i>Seguro Popular</i> covered 39.4% of people in rural populations, while 25.8% were without health-care coverage. Among indigenous populations, 23.8% reported being covered by <i>Seguro Popular</i> , and 23.3% being without health-care coverage.
González-Villalpando et al. <sup>16</sup>	2006 Countrywide <sup>c</sup>	Adults $\geq 20$ years with self-reported diabetes or hypertension.	Cross-sectional	Less than half of the participants (41.8%) were without health-care coverage. Among those with health-care coverage, a higher proportion was affiliated to <i>Seguro Popular</i> (28.9%), and a low proportion (5.4%) was covered by IMSS/ISSSTE. Also, 21% reported being covered by other health-care provider, and 15% informed attending to a private health-care provider.
Rivera-Hernández et al. <sup>29</sup>	2011–2012 Countrywide <sup>d</sup>	Adults $> 50$ years of age. Overall, 4276 participants lived in rural areas.	Cross-sectional	The majority of the rural populations (55.83%) were covered by <i>Seguro Popular</i> , followed by IMSS/ISSSTE (19.16%). However, 38.3% reported being without health-care coverage. <i>Seguro Popular</i> covered the majority of the indigenous population (65.0%), 17.1% were without health-care coverage, and the remaining 17.9% were affiliated to IMSS/ISSSTE.
Jiménez-Corona et al. <sup>26</sup>	2012 Country-wide <sup>d</sup>	Adults $\geq 20$ years of age with a diagnosis of T2DM.	Cross-sectional	The use of selected health-care services among rural populations was as follows: - 10.9% have had foot examination - 6.7% have had an ophthalmologic evaluation - 3.9% have had renal function evaluation Compared to urban dwellers, these proportions were lower for rural populations.
Latham and Calvillo <sup>28</sup>	2013	Adults with T2DM ( $n = 109$ ) in Tlaxcala, 80% were female.	Predictive correlational design.	The majority of participants were covered by <i>Seguro Popular</i> (60%), followed by those covered by the secretary of health or private insurance (32%). In addition, 8% reported not having health-care coverage.

IMSS, Instituto Mexicano del Seguro Social (Mexican Institute of Social Security); ISSSTE, Instituto de Seguridad y Servicios Sociales de los Trabajadores del Estado (Institute for Security and Social Services for State Workers); T2DM, type 2 diabetes mellitus.

<sup>a</sup> Analysis of ENSA 1994 (National survey of health 1994).

<sup>b</sup> Analysis of MHAS 2000 (Mexican Health and Aging Study 2000).

<sup>c</sup> Analysis of ENSANUT 2006 (National survey of health and nutrition 2006).

<sup>d</sup> Analysis of ENSANUT 2012 (National survey of health and nutrition 2012).



### Access to health care: barriers and facilitators

As illustrated in Table 3, research conducted on barriers and facilitators of health care in rural areas mainly focused on two general aspects:

- 1) Barriers and facilitators related to treatment control and compliance
- 2) Barriers and facilitators related to self-care

Before the Mexican health-care reform and in relation to barriers and facilitators of health care, an analysis of the National Health Survey of 1994 reported that among rural dwellers, there was a perceived insufficient attention from health-care providers.<sup>24</sup> Also, high costs of services were reported as one of the main reasons to not return to health-care services.

In 1994, a cross-sectional study was conducted among people with T2DM that aimed to determine the extent of unmet health needs related to primary health-care services, where the studied population was covered by social insurance (IMSS). In general, patients mentioned not having enough knowledge about their disease, as well as lack of access to other services offered by the institution, that in some cases, were not available in rural areas, for instance, consultation with nutritionists or dieticians.<sup>24</sup> In addition, Salinas-Martínez and coworkers (1999) noted that screening and monitoring were not performed sufficiently.<sup>35</sup>

Benjamins (2001) tested the association between religion and the use of preventive services and aimed at detecting chronic conditions among middle-aged and older adults. Religious salience in rural dwellers was similar among those who consider it very important (33%), somewhat important (32%), and not important (34%). The estimations showed that those who considered religion as very important were 9% and 28% less likely to have had blood pressure and diabetes screening, respectively, compared to those who consider religion not important. However, when adjusted by other factors, the general analysis showed that individuals who attended religious services were significantly more likely to report having blood pressure and diabetes screening in the past 2 years.<sup>22</sup> It is noteworthy to consider that Valenzuela et al. also mentioned the role of religion among personal beliefs as a barrier to self-care.<sup>33</sup>

A case–control study carried out by Vargas-Bustamante (2003) reported that cash transfers from government's poverty alleviation programs were facilitators of health-care access and were associated with lower out-of-pocket health-care expenditures.<sup>36</sup> Financial concern was a barrier to health care also mentioned by Valenzuela et al. (2003), where in conjunction with personal beliefs and lack of knowledge, represented the main barriers to care and self-care.<sup>33</sup>

After the health-care reform, Juárez-Ramírez et al. (2008) conducted a mixed-methods study in which they aimed at understanding how social support relates to treatment compliance. As mentioned before, fund transfers were seen as facilitators of health care, whereas other organizational aspects, such as lack of medicines supply, limited opening hours, and availability and transportation costs were seen as barriers. Likewise, language was reported as a critical barrier, as health-care services are provided in Spanish, and it is particularly difficult for indigenous people whose Spanish understanding is sometimes limited or nonexistent.<sup>27</sup>

Finally, in 2013, Latham conducted a study among rural populations in Tlaxcala and reported that some embedded health beliefs such as “evil eye” shape people's views of health-care providers.<sup>28</sup>

### Discussion

The coverage rate and use of health care among people with T2DM and/or hypertension living in rural areas in Mexico were reported only after the first National Health Survey. The health-care reform implementation at the federal level aimed to reduce the gap in health-care access in Mexico, and the focus was the poorest, most vulnerable groups, and nonsalaried workers who were not entitled to social security.<sup>15,37</sup>

This review identified that before the health-care reform implementation, three-quarters of the population did not have health-care coverage (more than 50 million people in 2013).<sup>24,35</sup> The large proportion of older adults without health-care coverage can be attributed to the fact that most of the participants had an informal job or were economically inactive, for instance, retirees or people dedicated to domestic labors.<sup>24</sup> As a result, most of them were not entitled to social security and had no access to health-care services through the state Ministry of Health on a welfare basis.<sup>15</sup> However, this situation changed since the implementation of *Seguro Popular*, when the population without health-care coverage older than 50 decreased by more than 30% from 2001 to 2012.<sup>38</sup>

The increased rates of health-care coverage have been largely recognized to be attributable to the successful implementation of the *Seguro Popular*, which has also served to reflect a limited national capacity to generate formal works that provide employees with social security benefits.<sup>39,40</sup> Furthermore, before the health-care reform implementation, the elevated cost of health care was an obstacle to health-care access, and the use of home remedies was a common practice among the elderly.<sup>24</sup> In contrast, by 2016, it was reported that less than 1% of the Mexican population used traditional medicine or visited a traditional healer.<sup>41</sup> This suggests that access to medication and health care has improved. However, these findings cannot be generalized, because the use of traditional medicine among indigenous populations is usually of a higher proportion than that of nonindigenous populations.<sup>42</sup>

The implementation of *Seguro Popular* has also proved to reduce the incidence of household catastrophic health expenses (>30% income) when compared to affiliation to other providers or not having health-care coverage.<sup>43,44</sup> Additionally, its implementation has been associated with lower poverty impact of out-of-pocket health expenditure, when compared to other poverty-reducing programs.<sup>45</sup>

Nevertheless, older adults affiliated to a health-care provider still present important out-of-pocket expenses, mainly to purchase medicines. Out-of-pocket expenses are greater among rural populations; making evident the inequality in health-care access, probably due to the inefficient drugs supply in local clinics.<sup>23,44–47</sup>

In order to reduce inequalities in health, social policies and programs are essential. In this study, it was reported that the *Oportunidades* program (cash transfer program) played an important role in reaching the poorer segments of the population, as well as those living in rural communities.<sup>15</sup> Similar conditional cash transfer programs in Latin America have been proved to have a positive effect on facilitating access to health services.<sup>48</sup> In brief, rural dwellers with T2DM and/or hypertension who were affiliated with a health-care provider had access to medical care, although their use of health services was infrequent compared with urban dwellers.

Similarly, in 2012, the use of ambulatory health services was still greater among nonindigenous populations when compared to indigenous populations, in spite of the similar proportion of health-care coverage by any provider.<sup>47</sup> In this context, the lack of use of the preventive services offered may be an additional reason for their poor control of glucose and blood pressure.<sup>23</sup>

**Table 3**

Summary of publications included in the review that addressed barriers and facilitators of health care.

Author(s)	Fieldwork years and region, state	Population	Study design	Barriers and facilitators of health care in rural areas
Borges-Yáñez and Gómez-Dantés <sup>24</sup>	1994 Countrywide <sup>a</sup>	Adults ≥20 years. Overall 9.9% of the participants had diabetes mellitus, 12.9% of women and 6.6% of men had hypertension.	Population-based study	When compared urban vs rural dwellers, the use of medicines was higher for urban people (OR = 2.3, CI = 1.25–2.29), whereas the use of traditional medicine and home remedies was higher among rural populations (OR = 1.2, CI = 1.02–1.52). In addition, 78% of the studied population (urban and rural) considered having received a good or very good service from their health-care provider. However, people indicated they would not return to their health-care provider mainly due to deficient attention, high costs of services and because their health status did not improve.
Salinas–Martínez et al. <sup>31</sup>	1999 North, Nuevo Leon	Adults with type 2 diabetes with ≥2 years of diagnosis and without hypertension, chronic kidney failure, or amputation.	Cross-sectional	Main barriers to health-care services use were lack of knowledge and lack of screening and monitoring.
Benjamins <sup>22</sup>	2001–2003 Countrywide <sup>b</sup>	Adults ≥50 years with hypertension. Rural population consisted of 33% (n = 3264) of the participants.	Cross-sectional	Religion was a mediator factor for health-care services used. Rural dwellers with a high religious salience, compared to the lowest level of salience, showed a lower likelihood of using preventive services such as blood pressure screening (OR = 0.91, CI = 0.28–1.02) and diabetes screening (OR = 0.72, CI = 0.65–0.79).
Vargas – Bustamante <sup>34</sup>	2003 Countrywide	Analysis of household's expenditure. Cases: households that received cash grants and welfare benefits from <i>Oportunidades</i> . Control: matched households that did not receive cash grants nor welfare benefits.	Quasi-experimental, case–control	Households from the case group had a higher probability of receiving diabetes tests (5%) and nutritional supplements (0.14%), compared with the reference group. Out-of-pocket health-care expenditures in cases were lower than in control villages, in areas reached by both federal and state clinics. Because of grant conditioning, households from cases villages observed higher rates of preventive care utilization regardless of clinic setting. Increased preventive care utilization, better health care, and grant conditioning could partly explain lower out-of-pocket health-care expenditures in the treatment village. Families that received benefits from federal clinics pay less out-of-pocket for health care and use preventive care more often than those who accessed state clinics. Compared to other countries in the study, inequity of access between rich and poor was most pronounced for Mexico, with a concentration index of 0.249 (CI = 0.087–0.403).
Goeppel <sup>25</sup>	2003 Countrywide	Adults aged ≥50 years with at least one chronic disease (arthritis, hypertension, stroke, angina, diabetes, chronic lung disease, asthma, or depression).	Cross-sectional	Participants with health-care coverage were significantly more likely to have access to basic chronic care than those without it. Health-care coverage was associated with a significantly lower risk of catastrophic out-of-pocket expenditure for the last outpatient visit. Living in rural areas was not associated with a lower likelihood of access to basic chronic care. Levels of dissatisfaction in Mexico were highest for all countries with 20.8% of participants dissatisfied or very dissatisfied with health-care services. Only 30.4% of rural residents had access to basic chronic care.
Valenzuela et al. <sup>33</sup>	2003 Morelos	Adults >40 years with T2DM (n = 37).	Qualitative – interviews	The main barriers to care and self-care were financial concerns, personal beliefs, and lack of knowledge. However, half of the respondents perceived family members as the most important source of social support, regarding illnesses such as diabetes. Physicians and friends appeared to provide less frequent support.

(continued on next page)

Table 3 (continued)

Author(s)	Fieldwork years and region, state	Population	Study design	Barriers and facilitators of health care in rural areas
Juárez-Ramírez et al. <sup>27</sup>	2008–2012 Countrywide	Adults ≥ 18 years of age with T2DM living in marginalized settings, who were members of a mutual support group and who had other members of the family with T2DM. Overall, 82.26% of participants were women. Population living in rural areas were 30.38%, and 35.26% were indigenous.	Sequential mixed-methods design	Barriers to health care related mostly to organizational aspects of medical units. These were (1) lack of medications which lead to out-of-pocket expenses; (2) limited opening hours and availability of health workers; (3) transportation costs, particularly for indigenous people in order to move to towns where the medical services were offered; (4) language, some people did not speak Spanish, the language in which health services are provided. Reported facilitators were fund transfers from poverty alleviation programs. In addition, the church was seen as part of emotional support for Catholic families. Embedded beliefs about illness attribution, such as “evil eye” and blood poisoning” were reported. People with these beliefs reported a moderate level of trust and professional support from the nurses who run the clinics. The strong negative relationship between health beliefs and professional support indicates that higher levels of traditional health beliefs negatively influenced participants’ views of health-care providers.
Latham <sup>28</sup>	2013	Adults with diabetes ( $n = 109$ ) in Tlaxcala, 80% were female.	Predictive correlational design	

CI, confidence interval; OR, odds ratio; T2DM, type 2 diabetes mellitus.

<sup>a</sup> Analysis of ENSA 1994 (National survey of health 1994).<sup>b</sup> Analysis of the MIHAS Wave I & II (Mexican Health and Aging Study 2001 & 2003).

We recognize several limitations in this systematic review. It is important to highlight that data were scarce regarding health-care access among rural and indigenous populations. Moreover, results were mainly based on cross-sectional studies; publication bias and interviewer bias cannot be disregarded. The strengths of this research are the use of literature in English and Spanish, given that the latter is the official language in Mexico, and in addition to the search strategy that included three different databases, it is likely that this review covered all or the majority of the published information in the studied topics.

### Conclusions

This systematic review found that the number of people covered by some health scheme has increased over the past 30 + years, mainly because of the *Seguro Popular* implementation. However, populations who remained without health-care coverage may be facing difficulties enrolling in this scheme; it has been reported that especially rural dwellers had difficulties collecting all of the documents required to enroll.<sup>17</sup>

The health-care reform that implemented the *Seguro Popular* was a positive step toward guaranteed nationwide health-care coverage. In the rural areas of Mexico, the introduction of the *Seguro Popular* has helped to reduce the gaps in health-care coverage by providing opportunities to people from vulnerable populations to enroll in a health-care plan at a low cost or no cost.

In general, the health services were undersupplied and suffered from a lack of effective and adequate human resources. Lack of medicine was a significant barrier to treatment adherence; short supply caused people to purchase their medicines, which posed an economic burden to many people through out-of-pocket expenditures. Moreover, among indigenous populations, the main barrier to health-care access was language, in that health-care personnel often cannot speak indigenous languages and the health-care users often cannot speak Spanish. Conversely, family and community support was a positive aspect that facilitated access to health care and treatment adherence.

This study provided important information in that it demonstrated that disparities do not only exist among urban and rural populations; indigenous populations are also regularly subject to inequalities in health care. As noted, while access to health-care coverage has improved, the number of skilled health professionals who practice in rural areas must be increased. Moreover, these professionals require further training to prepare them to serve indigenous populations better. In particular, the language barrier deserves special attention to reduce inequalities in health and to guarantee effective care for all; actions toward increasing the number of health professionals coming from the indigenous populations and incentives for them to remain in local areas should be prioritized.

Finally, additional research and follow-up in rural areas are encouraged as published data on health-care coverage in T2DM and hypertension among rural and indigenous populations in Mexico is scarce. Moreover, health promotion and disease prevention programs should be developed and adapted to serve rural and indigenous populations. These programs should be aimed to halt the increase in the prevalence of T2DM and hypertension and the complications related to them.

### Author statements

#### Ethical approval

None sought.



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## Competing interests

Gabriela Carrillo-Balam, Alejandra Cantoral, and Yanelli Rodríguez-Carmona declare no competing financial interests. Dirk Lund Christensen is currently a consultant for Novo Nordisk Mexico.

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